| | |
|---|---|
| Report No. | C0915870 |
| Specifications<br>Test Method | FCC Part 15.109(g), Class B<br>ANSI C63.4 1992 |
| Applicant<br>address | 16F, No. 75, Hsin Tai Wu RD., Sec. 1, Bldg #A<br>Hsi-Chih, Taipei Hsien, Taiwan |
| Applicant<br>Items tested<br>Model No. | CIS TECHNOLOGY INC.<br>10/100 Ethernet Hub Card<br>WS-HC04/D ( Sample # C09870 ) |
| Results<br>Sample received date | **Compliance** (As detailed within this report)<br>01/18/1999 (month / day / year) |
| Prepared by | project engineer |
| Authorized by<br><br>Issue date | Vice General Manager<br>(Jacob Lin )<br>(month / day / year) |
| **Modifications** | **None** |
| Tested by<br>Office and<br>Open site at | Training Research Co., Ltd.<br>No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsi-Chih Town,<br>Taipei Hsien, Taiwan, R.O.C. |

***Conditions of issue:***

(1) ***This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.***

(2) ***This report must not be used by the client to claim product endorsement by NVLAP or any agency of U.S. Government.***

★ ***FCC ID: L4OHC04D***

# Contents

## *List of support equipment*

### Conducted (Radiated) test:

| | | |
|---|---|---|
| **PC** | : | **ACER** |
| Model | : | VKT33T –X30 –0637X |
| Serial No. | : | TV69584 |
| FCC ID | : | HLZV65X-IDCATX |
| Power type | : | AC 110~120 / 220~240 VAC, Switching |
| Power cord | : | non-Shielded, 1.7m long, Plastic, no ferrite core |
| | | |
| **Monitor** | : | **HP** |
| Model No. | : | D2821 |
| Serial No. | : | TW 73512262 (TW 73147163) |
| FCC ID | : | A3KMO64 |
| Power type | : | AC 110~120 / 220~240 VAC, Switching |
| Power cord | : | Non-Shielded, 3m long, no ferrite core |
| Data cable | : | Shielded, 1.8m long, with ferrite core |
| | | |
| **Keyboard** | : | **Digital** |
| Model No. | : | KB-5923 |
| Serial No. | : | 9S74904837 (9S74904665) |
| FCC ID | : | E8HKB-5923 |
| Power type | : | By PC |
| Data cable | : | Shielded, 1.8m long, with ferrite core |
| | | |
| **Printer** | : | **HP** |
| Model No. | : | C2642A |
| Serial No. | : | SG69A196GV |
| FCC ID | : | B94C2642X |
| Power type | : | AC 220 VAC |
| Power cord | : | Non-shielded, 2m long, no ferrite core |
| Data cable | : | Shielded, 1.84m long, no ferrite core (1.7m) |

| | | |
|---|---|---|
| **Modem** | : | **ACEEX** |
| Model No. | : | XDM-9624, XDM-1414 |
| FCC ID | : | IFAXDM-9624, IFAXDM-1414 |
| Power type | : | 220VAC, 50Hz / 9VAC, 1A |
| Power cord | : | Non-shielded, 1.9m long, no ferrite cord |
| Data cable | : | RS232, Shielded, 1.2m long, no ferrite core |
| | | RJ11C x 2, 7' long non-shielded, no ferrite core |

| | | |
|---|---|---|
| **Mouse** | : | **Hewlett Packard Mouse** |
| Model No. | : | C3751B |
| Serial No. | : | LCA52707170 |
| FCC ID | : | DZL210582 |
| Power type | : | Powered by PC |
| Power Cable | : | Non – Shielded. 5.5' long, Plastic hoods, No ferrite bead |

| | | |
|---|---|---|
| **Joystick** | : | **Padix** |
| Model | : | QF-305U, QF-3 ( DoC Approval ) |
| Power Type | : | By PC |

# *Chapter 2 Conducted emission test*

## *Test condition and setup:*

All the equipment is placed and setup according to the ANSI C63.4 - 1992.
The EUT is assembled on a wooden table that is 80 cm high, is placed 40 cm from the back-wall which is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground .The EUT's LISN connect a line switch box for selecting L1 or L2 ,then connect to a preamplifier and spectrum.

The spectrum scans from 150KHz to 30MHz. Conducted emission levels are detected at max. peak mode . But if the max. peak mode failed ,it will be measured by CISPR's quasi-peak detection mode .

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

## *List of test Instrument:*

| | | | | Calibration Date | |
|---|---|---|---|---|---|
| Instrument Name | Model No. | Brand | Serial No. | Last time | Next time |
| Spectrum analyzer | 8594EM | H P | 3710A00279 | 01/07/99 | 01/07/00 |
| LISN (EUT) | 3825/2 | EMCO | 9411-2284 | 05/15/98 | 05/15/99 |
| LISN (Support E.) | AC3-001 | TRC | - - - - - - - - - | 05/15/98 | 05/15/99 |
| Preamplifier | AC3-002 | TRC | - - - - - - - - - | 05/15/98 | 05/15/99 |
| Line switch box | AC3-003 | TRC | - - - - - - - - - | 05/15/98 | 05/15/99 |

The level of confidence of 95%, the uncertainty of measurement of conducted emission is ± 2.4 dB.

***Test Result: Pass (Appendix A)***

# *Chapter 3 Radiated emission test*

## *Test condition and setup:*

***Pretest:*** Prior to the final test (OATS test), the EUT is placed in a anechoic chamber and scan from 30MHz to 1GHz.This is done to ensure the radiation exactly emits form the EUT.

***Final test:*** Final radiation measurements are made on a **10 - meter,** open-field test site. The EUT is placed on a nonconductive table that is 0.8m height, the top surface is 1.0 x 1.5 meter. The placement is according to ANSI C63.4 - 1992.

The spectrum is examined from 30 MHz to 1000 MHz measured by HP spectrum.

The EMCO whole range Antenna is used to measure frequency from 30 MHz to 1GHz.The final test is used the spectrum HP 8594EM.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading .The spectrum analyzer's 6dB bandwidth is set to 120 KHz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the data will be rechecked by the tester and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from anechoic chamber will be taken as the final data.

## *List of test Instrument:*

| | | | | Calibration Date | |
|---|---|---|---|---|---|
| Instrument Name | Model No. | Brand | Serial No. | Last | Next |
| Spectrum analyzer | 8594EM | H P | 3619A00198 | 11/17/98 | 11/17/99 |
| RF Pre-selector | AC4-001 | TRC | - - - - - - - - - | 05/15/98 | 05/15/99 |
| Antenna (30M-2G Hz) | 3141 | EMCO | 9711-1076 | 12/17/98 | 12/17/99 |
| Open test side (Antenna, Amplify, cable calibrated together) | | | | 05/15/98 | 05/15/99 |

The level of confidence of 95%, the uncertainty of measurement of radiated emission is ± 4.96 dB.

***Test Result: Pass (Appendix B)***

# *Appendix A*

## *Conducted Emission Test Result: ( 10Mbps )*

Testing room: Temperature : 23 ° C Humidity : 54 % RH

### *Line 1*

| FREQUENCY ( KHz) | READING AMPLITUDE | | | LIMIT | | MARGIN ( dB ) |
|---|---|---|---|---|---|---|
| | Peak (dBμV/m) | Quasi-peak (dBμV/m) | Average (dBμV/m) | Quasi-Peak (dBμV/m) | Average (dBμV/m) | |
| 156 | 47.78 | ***.** | ***.** | 65.83 | 55.83 | -8.05 |
| 641 | 35.41 | ***.** | ***.** | 56.00 | 46.00 | 10.59 |
| 769 | 36.87 | ***.** | ***.** | 56.00 | 46.00 | -9.13 |
| 857 | 34.58 | ***.** | ***.** | 56.00 | 46.00 | -11.42 |
| 886 | 36.24 | ***.** | ***.** | 56.00 | 46.00 | -9.76 |
| 1003 | 36.36 | ***.** | ***.** | 56.00 | 46.00 | -9.64 |
| 1099 | 35.49 | ***.** | ***.** | 56.00 | 46.00 | -10.51 |
| 1224 | 35.24 | ***.** | ***.** | 56.00 | 46.00 | -10.76 |
| 1340 | 36.14 | ***.** | ***.** | 56.00 | 46.00 | -9.86 |
| 1769 | 35.20 | ***.** | ***.** | 56.00 | 46.00 | -10.80 |

### *Line 2*

| FREQUENCY ( KHz) | READING AMPLITUDE | | | LIMIT | | MARGIN ( dB ) |
|---|---|---|---|---|---|---|
| | Peak (dBμV/m) | Quasi-peak (dBμV/m) | Average (dBμV/m) | Quasi-Peak (dBμV/m) | Average (dBμV/m) | |
| 156 | 46.61 | ***.** | ***.** | 65.83 | 55.83 | -9.22 |
| 457 | 35.89 | ***.** | ***.** | 57.23 | 47.23 | -11.34 |
| 582 | 35.01 | ***.** | ***.** | 56.00 | 46.00 | -10.99 |
| 641 | 35.65 | ***.** | ***.** | 56.00 | 46.00 | -10.35 |
| 764 | 36.37 | ***.** | ***.** | 56.00 | 46.00 | -9.63 |
| 880 | 36.26 | ***.** | ***.** | 56.00 | 46.00 | -9.74 |
| 1009 | 36.49 | ***.** | ***.** | 56.00 | 46.00 | -9.51 |
| 1099 | 34.91 | ***.** | ***.** | 56.00 | 46.00 | -11.09 |
| 1224 | 35.33 | ***.** | ***.** | 56.00 | 46.00 | -10.67 |
| 1340 | 35.30 | ***.** | ***.** | 56.00 | 46.00 | -10.70 |

* The reading amplitudes are all under average limit.

## *Conducted Emission Test Result: ( 100Mbps )*

Testing room: Temperature : 20 ° C Humidity : 61 % RH

***Line 1***

| FREQUENCY ( KHz) | READING AMPLITUDE | | | LIMIT | | MARGIN ( dB ) |
|---|---|---|---|---|---|---|
| | Peak (dBμV/m) | Quasi-peak (dBμV/m) | Average (dBμV/m) | Quasi-Peak (dBμV/m) | Average (dBμV/m) | |
| 157 | 47.95 | ***.** | ***.** | 65.80 | 55.80 | -7.85 |
| 641 | 36.89 | ***.** | ***.** | 56.00 | 46.00 | -9.11 |
| 759 | 37.10 | ***.** | ***.** | 56.00 | 46.00 | -8.90 |
| 880 | 36.45 | ***.** | ***.** | 56.00 | 46.00 | -9.55 |
| 1099 | 35.24 | ***.** | ***.** | 56.00 | 46.00 | -10.76 |
| 1224 | 35.31 | ***.** | ***.** | 56.00 | 46.00 | -10.69 |
| 1410 | 35.41 | ***.** | ***.** | 56.00 | 46.00 | -10.59 |
| 1526 | 35.20 | ***.** | ***.** | 56.00 | 46.00 | -10.80 |
| 1646 | 35.44 | ***.** | ***.** | 56.00 | 46.00 | -10.56 |
| 1769 | 35.27 | ***.** | ***.** | 56.00 | 46.00 | -10.73 |

***Line 2***

| FREQUENCY ( KHz) | READING AMPLITUDE | | | LIMIT | | MARGIN ( dB ) |
|---|---|---|---|---|---|---|
| | Peak (dBμV/m) | Quasi-peak (dBμV/m) | Average (dBμV/m) | Quasi-Peak (dBμV/m) | Average (dBμV/m) | |
| 157 | 45.96 | ***.** | ***.** | 65.80 | 55.80 | -9.84 |
| 518 | 34.85 | ***.** | ***.** | 56.00 | 46.00 | -11.15 |
| 641 | 36.62 | ***.** | ***.** | 56.00 | 46.00 | -9.38 |
| 759 | 36.94 | ***.** | ***.** | 56.00 | 46.00 | -9.06 |
| 880 | 35.65 | ***.** | ***.** | 56.00 | 46.00 | -9.35 |
| 1009 | 36.16 | ***.** | ***.** | 56.00 | 46.00 | -9.84 |
| 1099 | 34.72 | ***.** | ***.** | 56.00 | 46.00 | -11.28 |
| 1184 | 34.66 | ***.** | ***.** | 56.00 | 46.00 | -11.34 |
| 1224 | 34.52 | ***.** | ***.** | 56.00 | 46.00 | -11.48 |
| 1410 | 34.66 | ***.** | ***.** | 56.00 | 46.00 | -11.34 |

* The reading amplitudes are all under average limit.

# *Appendix B*

## *Radiated Emission Test Result: (Horizontal)( 10Mbps )*

Test Conditions:

Testing room : Temperature : 17 ° C Humidity : 70 % RH

Testing site : Temperature : 16 ° C Humidity : 66 % RH

| Frequency | Reading Amplitude | Ant. Height | Table | Correction Factors | Corrected Amplitude | Class B limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | dBμV | m | degree | dB/m | dBμV/m | dBμV/m | dB |
| 800.010 | 52.99 | 0.99 | 254 | -18.38 | 34.61 | 37.00 | -2.39 |
| 900.040 | 48.14 | 0.99 | 149 | -18.70 | 29.44 | 37.00 | -7.56 |
| 950.240 | 46.64 | 0.99 | 7 | -16.63 | 30.01 | 37.00 | -6.99 |
| *** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Note:

1.Margin = Amplitude - limit, *if margin is minus means under limit.*

2.Corrected Amplitude = Reading Amplitude + Correction Factors

3.Correction factor = Antenna factor + ( Cable Loss - Amplitude gain)

(For example : 30MHz correction factor = 15.5 + (-15.26) = 0.24 dB/m)

## *Radiated Emission Test Result: (Vertical)( 10Mbps )*

| Frequency | Reading Amplitude | Ant. Height | Table | Correction Factors | Corrected Amplitude | Class B limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | dBμV | m | degree | dB/m | dBμV/m | dBμV/m | dB |
| 150.010 | 51.71 | 0.99 | 327 | -23.64 | 28.07 | 30.00 | -1.93 |
| 175.000 | 52.14 | 0.99 | 11 | -23.03 | 29.11 | 30.00 | -0.89 |
| 200.330 | 47.17 | 0.99 | 273 | -22.74 | 24.43 | 30.00 | -5.57 |
| 224.990 | 47.23 | 0.99 | 58 | -21.55 | 25.68 | 30.00 | -4.32 |
| *** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

## *Radiated Emission Test Result: (Horizontal)( 100Mbps )*

Test Conditions:

Testing room : Temperature : 16 ° C Humidity : 72 % RH

Testing site : Temperature : 15 ° C Humidity : 73 % RH

| Frequency | Reading Amplitude | Ant. Height | Table | Correction Factors | Corrected Amplitude | Class B limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | dBμV | m | degree | dB/m | dBμV/m | dBμV/m | dB |
| 744.220 | 46.89 | 0.99 | 206 | -15.86 | 31.03 | 37.00 | -5.97 |
| 800.030 | 51.64 | 0.99 | 229 | -18.38 | 33.26 | 37.00 | -3.74 |
| 868.670 | 48.53 | 0.99 | 7 | -19.09 | 29.44 | 37.00 | -7.56 |
| *** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Note:

4.Margin = Amplitude - limit, *if margin is minus means under limit.*

5.Corrected Amplitude = Reading Amplitude + Correction Factors

6.Correction factor = Antenna factor + ( Cable Loss - Amplitude gain)

(For example : 30MHz correction factor = 15.5 + (-15.26) = 0.24 dB/m)

## *Radiated Emission Test Result: (Vertical)( 100Mbps )*

| Frequency | Reading Amplitude | Ant. Height | Table | Correction Factors | Corrected Amplitude | Class B limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | dBμV | m | degree | dB/m | dBμV/m | dBμV/m | dB |
| 150.010 | 51.31 | 3.95 | 5 | -23.64 | 27.67 | 30.00 | -2.33 |
| 175.000 | 52.61 | 0.99 | 13 | -23.03 | 29.58 | 30.00 | -0.42 |
| 200.300 | 44.63 | 0.99 | 261 | -22.75 | 21.88 | 30.00 | -8.12 |
| *** | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

***Final statement:***

***This test report, measurements made by TRC are traceable to the NIST.***